Education and Inequality: Explaining Stagnating
Male Educational Attainment in the U.S.

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I. Introduction

The benefits of earning a college degree are indisputable, especially in a troubled economy. A substantial body of research has linked increases in educational attainment with rising living standards, lower unemployment rates, higher wages, and reduced income inequality. In April 2012, the unemployment rate for Americans with only a high school diploma was 8%, nearly twice as high as the 4.2% unemployment rate for college graduates. Over the past three decades, the average wage of college-educated workers has increased significantly relative to wages for high-school educated workers and today college graduates earn on average 45% more than demographically similar high-school graduates.

Higher levels of educational attainment also increase economic growth. Within the U.S., metro areas with higher percentages of college-educated workers in 1980 showed faster growth over the subsequent decades (Glaeser 2011). In addition, metro areas with higher percentages of college educated workers show higher wages not only for college-educated workers but also for workers with only a high-school education (Moretti 2012). However, in recent decades, growth in attainment has stagnated. This stagnation impedes economic growth, wastes human potential, and contributes to rising inequality.

Goldin and Katz (2008) argue that much of the increase in U.S. income inequality since the late 1970s can be attributed to this slowdown in educational attainment. They show that demand for higher skill in U.S. labor markets has increased at a constant rate over the past century. By contrast, the supply of skilled workers (i.e., changes in educational attainment) has varied considerably over the

past century. Thus, the rapid rises in educational attainment in the years immediately following the Second World War, reduced the wage gap between college-educated workers and high-school-educated workers. However, in the past 30 years, educational attainment has stagnated. As a consequence, the wage gap between college-educated workers and high-school-educated workers has increased dramatically leading to greater income inequality.

Much of the slowdown is the result of flagging male educational attainment. Starting in the 1970s, the percentage of men in their mid to late twenties with a college degree plateaued (Wilson et al. 2011; Wessel and Banchero 2012). Today, the percentage of males with a bachelor degree is only slightly above the percentage in the 1970s, despite modest increases in male college enrollment. By contrast, women show rising college graduation rates over this period. Obviously, stagnant college completion rates pose a threat on the future of the U.S. economy, yet solving this crisis requires a detailed look into the reasons that Americans, especially American men are failing to graduate from post-secondary institutions.

One obvious candidate is rising tuition costs. According to Bloomberg, college tuition has increased 1,120% since 1978, which is four times faster than the consumer price index. However, the high tuition rates should affect the graduation rates of both men and women, yet women continue to show higher educational attainment than their mothers. The abysmal male college completion rates are now the subject of nationwide concern. Groups such as the American Council on Education, *The New York Times*, and the HCM Strategists have proposed policies and strategies to raise college completion rates (Wright et al., 2012). Their proposals

include reforming financial aid policies, changing remedial class structures, and awarding college credit for experience.

While it is obvious that college completion is a pressing social issue, the central puzzle is why males have lagged behind. A possible culprit for the low graduation rates for males could be their major. Men are the overwhelming majority within the STEM fields. While the percentage of women graduating college have far surpassed the percentage of male graduates, men still dominate many of the science, technology, engineering, and math courses or STEM. According to Forbes, the employment rate of women in STEM fields has not grown since 2000, despite their rising educational attainment. For example, women earn only 20% of bachelor degrees in computer science, even though women earn 60% of all bachelor degrees.

The STEM fields are notoriously challenging and have a high dropout rate and transfer rate. While some students may not be adequately prepared for the college work, others are not used to the low grades and heavy workloads designed to weed out students who are not serious about the major. Additionally, grade inflation in humanities courses may cause natural science majors to become discouraged as they face relatively more rigorous grading (Rojstaczer and Healy 2010). As men constitute the vast majority of students in these classes, the pressure of the STEM courses may affect them to a greater degree, which could lead to the deviation of graduation rates among men and women. Consequently, this paper will test whether the differences in college graduation rates among males and females can be explained by the higher prevalence of males in STEM.

Another potential culprit for the lagging college completion rates for males and females could stem from the changing demographics. Over the past 30 years, divorce rates have been rising and, as a consequence, the likelihood that a child will grow up in a single parent household has also risen. But divorce did not rise at the same rate across income groups. The bottom 30% of earners have seen a stark rise in divorce rates, increasing from around 4% in 1960 to 35% in 2010 (Murray 2012). The top 20% of earners, on the other hand, saw much more modest increases, from around 1% in 1960 to 7% in 2010 (2012). Not surprisingly then, we see large increases in the percentage of low-income children raised in single parent households. Only 2% of poor children (families in the bottom 30% of the distribution) in 1960 were raised in single-parent families. By 2010, the figure had risen to 23%. By contrast, only 2.5% of rich children (families in the to 20% of the distribution) were raised in single-parent families in 2010 (up from under 1% in 1960).

Because this change in family dynamics is consistent with the time frame for lagging male college completion and because most single-parent households are female headed, we investigate whether the rising rates of single-parent households exert a differential impact on the college completion rates of males and females. Additionally, we investigate whether family income explains gender differences in college completion rates.

II. Literature Review

From 1980 to 2005, the relative supply of college-educated workers increased by just 2 percent a year (Goldin and Katz, 2009). By contrast, the relative supply of college-educated workers increased by 3.8 percent a year from 1960 – 1980. This slowdown in attainment from 1980 -2005 occurred as the wage gap between college graduates and non-graduates increased significantly. In 2012, college graduates earned between 65 and 75 percent more than nongraduates (i.e., dropouts and those who didn't enroll), but estimates` vary depending on the data source (Canon and Gascon, 2012). Thus, the slowdown in educational attainment is a surprise given that the benefits of a college degree rose dramatically.

Altonji, Bharadwaj, and Lange (2008) investigate the response to the larger gap in wages between skilled workers and unskilled workers and argue that most of the increase in skills between 1979 and 1997 is the result of increases in parental education and not a behavioral response the wage gap. After controlling for parental education, race and gender, and family structure constant, the supply response to the increase in the wage gap was minimal.

Moreover, the source of much of the slowdown in attainment is stagnating male educational attainment. J.A. Wilson et al (2009) find modest increases in educational attainment for those ages 25-54 over the past 10-15 years, with women accounting for most of the continued increase. Moreover, the National Center of Education Statistics predicts that enrollments of women aged 25 and older will outnumber 18-24 male enrollees within the next decade. Additionally, they predict

continued increases of women 18-24 with only a very modest increase of 25 and older male enrollees.

Conger and Long (2010) consider the factors that cause male lower graduation rates using data from four-year colleges in Florida and Texas. They find that males take fewer college credits and obtain lower grades than females in their first semester of enrollment. Additionally, they argue the lower male college persistence rate is not driven by differences in "differences in demographics, the quality of high schools and neighborhoods, high school test scores, or the selectivity of the university attended by male and female college enrollees" (Conger and Long 2010).

They argue instead that males have lower high school grades upon college entry and enroll in more difficult college courses. They find that males are less likely to enroll in college, but those that do enroll have higher SAT scores than females and are placed in fewer remediation mathematics courses. Additionally, they find that females are less likely to major in mathematics and engineering and attend colleges that have "looser admissions requirements and higher admissions rates" (Conger 4). Their findings however contradict the higher graduation rates among selective schools reported in Hess et al. (2009).

Hess et al. (2009) consider the impact of differences in college admissions selectivity on graduation rate. They utilize data from a range of post-secondary institutions including: large public research universities, small private liberal arts colleges, highly selective institutions to regional open admission institutions. They

find that the graduation rate decrease is not due to the colleges that have strict admissions standards, but from those that admit many, but graduate very few. Using Barron's selectivity standards, they found that the average six-year graduation rate and range rises as selectivity rises and vice versa. Their research results suggest that highly selective colleges and admissions standards are not likely the largest cause of the high male college drop out rate.

Consistent with this result, Bound et al. (2010) find that the declines in college completion rates are the most pronounced at community colleges and less selective public universities. Intriguingly, they found that among public universities, the faculty-to-student ratio accounted for over three-quarters of the total observed college completion rate, while college preparedness has a negligible effect. However, in community colleges college preparedness accounts for 90% of the drop out rate while faculty-to-student ratios and expenditures per student had an insignificant effect.

Canon and Gascon (2012) offer two explanations concerning stagnating educational attainment. First, risk may prevent many students from enrolling in college. The lost wages during their college years and the high tuition rates are not always off-set by the college premium wages. This makes the college investment risky. Second, prospective students may fear that if they drop out of college after accumulating thousands of dollars in loans, they will fail to earn any wage premium. In general, students who drop out after two years of college earn no more on average than high school educated workers. Additionally, the high unemployment rates of recent college graduates during the current economic downturn may

prevent prospective student from making an investment in college when they are not guaranteed a high paying job after they graduate. Yet as both males and females are equally affected by these risks and high costs, this explanation fails to explain why female attainment continues to rise while male attainment stagnates.

Wells et al. (2011) affirm that educational expectations are a strong predictor in future educational attainment. Under this assumption, they attempt to test social factors such as peer and family influence, socioeconomic status, as well as race and ethnicity play a role in postsecondary educational expectation. They find that women are more likely than men to expect to earn a college degree. While this does explain why more females earn bachelor's degrees than their male counterparts, they fail to explain why males continue to enroll in college at larger rates than their fathers, but graduate at lower rates than their fathers.

But other explanations may account for this differential effect. Goldin et al (2006) use three longitudinal data sets of high school students to understand the gender difference in attainment. They find that differences in maturity between high-school males and high-school females cause males to fall behind with both their college preparations and applications. They argue that between 1980 and 1992, the test scores of females rose relative to males likely because their high school courses became more science and mathematics oriented. Additionally, cultural norms changed during this time period and women became more serious about their education and less serious about finding a spouse during their college years.

In support, they report a steady rise in the average age of women on the date

of their first marriage. The sociological change that caused women to take their

undergraduate degrees more seriously which enriches the current question, but still

leaves out other factors such as majors and college retention rates within the

majors. Additionally, their data is now twenty years old and while it describes the

lead up to the current problem, the data needs to be refreshed.

III. Data and Methods

The data used in this analysis was obtained from the *National Center for

Education Statistics*, which intended to target a sample cohort of first time students

who began their postsecondary education in the academic year 2003-2004. The

initial sample size began with 18,640 students and at the conclusion of the data

collection time frame, 16,680 students provided enough data to be classified as

eligible survey respondents. To enable researchers to track bachelor's degree

completion, the cohort was limited to first-time bachelor's degree program students.

The *National Center for Education Statistics* allows for researchers to analyze

their classified data set using their statistical package, Powerstats. By keeping their

respondents anonymous, they both protect the student's privacy as well as allow for

researchers to use their datasets. However, Powerstats has a series of limitations.

First, we software does not allow researchers to create new variables. Thus, we are

unable to create interaction terms. Second, the only procedure available for

regressions on dichotomous variables is logit and, consequently, we are unable to

run probit analyses.

IV. Discussion of Results

Table 1 describes the summary statistics of this dataset on the variables of interest. From Table 1, we see that women complete college at higher rates than men. About 59 percent of men in sample complete a bachelor's degree in six years. By contrast, about 66 percent of women complete a bachelor's over the six-year period. In addition, a number of other factors are associated with higher rates of college completion: low-income, parents no longer married, choice of a major other than the physical sciences, and white or asian race. Only 48 percent of low-income students in the sample completed college in six years, 28 percentage points lower than the completion rate for high-income students. This income-based college completion gap is roughly the same for men and women.

The married/unmarried gap in college completion is nearly as large. Seventy percent of students with married parents complete college in six years but only 47 percent of students with unmarried parents complete college. Broken out by gender, the married/unmarried completion gap is slightly lager for women (25 percentage points versus 21 points). Finally, we note that completion rates are slightly higher for students who initially choose to major in the physical sciences. Sixty-six percent of students who initially choose to major in physical sciences finish a bachelor's degree in six years. Completion rates outside of the physical sciences are slightly lower at 63 percent. This lower completion rate relative to the physical sciences is due entirely to differences in male completion rates. For women, completion rate does not vary with choice of major.

To test our hypotheses regarding college completion, we run logistic regressions controlling for parental income, parental marital status, race, choice of college major, and gender. Tables 2 and 3 report the logit regression results. The first set of regressions reported in Table 2 tests the first hypothesis: differences in choice of major explain stagnating male educational attainment. That is, men choose to major in the physical sciences at higher rates. Because grading standards in the physical sciences are more demanding, males graduate at lower rates.

Table 2 reports In the first set of logistic regressions, the independent variables included gender, race, income, parental marital status, and major. Each variable is a dummy and female was the omitted class in gender, high-income was omitted from income (with low and middle income included), whites and Asians were omitted from race, married parents were omitted from parental marital status, and finally humanities majors were omitted from major (with physical science and other majors included).

Column 1 displays results that are consistent with previous studies and the accompanied literature. As the summary statistics implied, the regression results showed that males are graduating only .6841 times as often as females. Students with unmarried parents complete a bachelor's degree only .4969 times as often as students who have married parents. Additionally, students who are not white or Asian only graduate .6061 times as often as students who are white or Asian. Low income is the largest factor impacting graduation rates, with low income students only graduating .4514 times as often as those from high-incomes and middle income students graduating slightly over half as often as high-income students. However,

the results depict students in physical science majors are actually more likely to graduate than those in humanities courses. Students who choose to major in the physical science as freshman graduate 18% more often than humanities majors. This is surprising as evidence shows that grading standards are higher in the physical sciences.

To test whether the male overrepresentation in physical science majors accounts for stagnating male college completion rates column 2 omits major as an independent variable. The omission results in an insignificant change in the likelihood that a male would obtain a bachelor's degree, specifically the odds ratio changes from .6841 in column 1 and .6849 in column 2. This suggests that choice of major is unable to explain the gender gap in college completion and hence stagnating male college completion rates.

Finally, columns 3 and 4 show regression results by gender. Column 3 reports an analysis that includes only males while Column 4 includes only females. The results show that males are actually more likely to graduate than females when they have a physical science major. Females in physical science majors graduate 14% more often than females who choose to major in the humanities while males who choose to major in the physical sciences graduate 27% more often than male humanities majors. This leads to the conclusion that despite grade inflation and a male tendency towards physical science majors, majoring in the physical sciences actually increases the likelihood that males would graduate college and thus forces us to reject our first hypothesis.

Using a sequence of four additional regressions we test our second hypothesis; low income and unmarried parents exert a differential impact on the college completion rates for males and females. Table 3 reports logit regressions on college completion, designed to test this hypothesis. Like Table 2, the analyses control for parental marital status, race, income level, and gender. Column 1 of table 3 repeats the specification from Column 2 of Table 2 but includes only males. Likewise, Column 2 of Table 3 repeats the specification from Column 2 of Table 2 but includes only females.

Comparing the two regressions, males show somewhat greater response to low-income parents and middle-income parents than females. Males from low-income families and unmarried parents graduate .4102 times as often males from high-income and low-income females graduating .4967 times as often as females from high-income households. Middle-income males also fare worse than middle-income females. Middle-income females graduate .5921 times as often as high-income females while middle-income males only graduate .5473 as often as middle income males. Interestingly, males fare better than females when their parents are unmarried. In the entire group, females graduate only .4477 times as often as females from unmarried households while males from unmarried households graduate .5637 times as often as males from married households.

While men from unmarried households generally complete college at higher rates than women from unmarried households, the pattern reverses when we consider only low-income households. Columns 3 and 4 of Table 3 include only low-income males and low-income females respectively and depict a very different story

than the whole sample. While low-income females graduate .6844 times as often as middle and high income females, males fall behind and only graduate .4454 times as often as middle and high-income males. This is significant because divorce rates and therefore children in unmarried households rose dramatically among low-income families over the past three decades. By contrast, divorce rates rose only modestly among high-income families. Thus, the differential response of males and females from low-income unmarried-parent households may explain the stagnating male college completion rates. Of course, it remains an open question why exactly low income and unmarried parents has a differential effect across men and women.

V. Conclusion

Stagnating male educational attainment over the past 30 years is a significant cause for concern. Indeed, Goldin and Katz (2008) show that stagnating educational attainment is an important cause of rising inequality. In this paper, we test whether choice of college major and a differential response to low income and unmarried parents explain stagnating male educational attainment. Because men choose to major in the physical sciences more often than women and the physical sciences show higher grading standards, choice of college major may explain gender differences in attainment.

However, we find no evidence to support this claim. Despite the difficulty of physical science major, the cohort was actually more likely to graduate than those students who initially majored in humanities. Additionally, college major did not have a negative impact on male college completion rates. In fact, males who chose to

major in physical sciences graduated at higher rates than men who chose not to major in the physical sciences. One possible explanation is that the potential payoff of a degree in a physical science gave the students incentives to remain in school despite their relatively lower grades. An additional possibility is that students who choose to major in the physical sciences are simply more motivated irrespective of future salary rewards.

The second major conclusion of this paper is that rising divorce rates may explain stagnating male educational attainment. We find that low-income males with unmarried parents complete college at much lower rates comparably worse than low-income females with unmarried parents. While the overall rates of single-parent households and divorce rates have been rising since the 1960s, single parenthood and divorce rates have been rising significantly faster in low-income households. The timeframe over which male attainment has slowed coincides with these rising divorce rates.

One potential explanation for the differences in male and female success could be the prevalence of single mothers compared to single fathers. While females have a strong female role model in their lives, which could inspire them to emulate their mothers, males in low-income families where the marriage has failed, often do not have a strong male presence in their lives. While this explanation is purely speculative, further research and policies should focus on at risk males in low-income households to determine how to improve their college retention and completion rates.

VI. Tables

Table 1: Summary Statistics

Variable Name	Weighted Sample Size	Percentage	Standard Error
MALE	652	59.4	1.42
FEMALE	810.1	66.3	1.2
WHITEASIAN	1,096.60	67.8	1.02
OTHERRACE	365.4	49.4	2.01
LOWINC	309.5	48.5	1.9
MIDINC	727.4	61.8	1.41
HIGHINC	425.2	76.3	1.31
MARRIED	1,013.60	70.2	1.08
UNMARRIED	448.5	47.5	1.7
HUMANITIES	124.8	63.6	2.89
PHYSCI	13.9	66.1	6.16
OTHERMAJOR	1,323.30	63.2	1.12
FEMWHITEASIAN	602.5	71.3	1.11
FEMOTHER	207.6	51.9	2.55
FEMLOW	176.5	52.5	2.65
FEMMID	414.6	65	1.73
FEMHIGH	219	79.8	1.61
FEMMARRIED	553.4	74.1	1.12
FEMUNMARRIED	256.7	49.4	2.03
FEMHUMANITIES	77.4	66.7	3.75
FEMPHYSCI	6	66.1	10.1
FEMOTHERMAJOR	726.7	66.3	1.28
MALEWHITEASIAN	494.2	63.7	2.24
MALEOTHER	157.8	46	6.12
MALELOW	132.9	43.1	6.36
MALEMID	312.8	57.6	3.24
MALEHIGH	206.2	72.7	2.58
MALEMARRIED	460.2	65.5	2.36
MALEUNMARRIED	191.8	44.9	5.41
MALEHUMANITIES	47.4	58.6	7.87
MALEPHYSCI	7.9	66.1	13.2
MALEOTHERMAJOR	596.6	59.4	2.48
FEMLOWWHITEASIAN	92.4	60.1	3.18
FEMLOWOTHER	84.2	44.2	3.89
FEMLOWMARRIED	70.3	59.9	3.57
FEMLOWUNMARRIED	106.2	47.7	3.3
MALELOWWHITEASIAN	74.2	51.7	3.78
MALELOWOTHER	58.8	32.3	3.56
MALELOWMARRIED	52.6	56.9	4.58
MALELOWUNMARRIED	80.3	34.1	3.12

MALE-percentage of males who attained a bachelor's degree
FEMALE-percentage of females who attained a bachelor's degree
WHITEASIAN-percentage of Whites/Asians who attained a bachelor's degree

OTHERRACE-percentage of all other races who attained a bachelor's degree
LOWINC-percentage of low-income students who attained a bachelor's degree
MIDINC-percentage of middle-income students who attained a bachelor's degree
HIGHINC-percentage of high-income students who attained a bachelor's degree
MARRIED-percentage of students from married households who attained a bachelor's degree
UNMARRIED-percentage of students from unmarried households who attained a bachelor's degree
HUMANITIES-percentage of students in humanities majors who attained a bachelor's degree
PHYSCI-percentage of students in a physical science major who attained a bachelor's degree
OTHERMAJOR-percentage of students in all other majors who attained a bachelor's degree
FEMWHITEASIAN-percentage of white/asian females who attained a bachelor's degree
FEMOTHER-percentage of all other race females who attained a bachelor's degree
FEMLOW-percentage of low-income females who attained a bachelor's degree
FEMMID-percentage of middle-income females who attained a bachelor's degree
FEMHIGH-percentage of high-income females who attained a bachelor's degree
FEMMARRIED-percentage of females from married households who attained a bachelor's degree
FEMUNMARRIED-percentage of females from unmarried households who attained a bachelor's degree
FEMHUMANITIES-percentage of females in humanities majors who attained a bachelor's degree
FEMPHYSCI-percentage of females in physical science majors who attained a bachelor's degree
FEMOTHERMAJOR-percentage of females in other majors who attained a bachelor's degree
MALEWHITEASIAN-percentage of white/asian males who attained a bachelor's degree
MALEOTHER-percentage of all other race males who attained a bachelor's degree
MALELOW-percentage of low-income males who attained a bachelor's degree
MALEMID-percentage of middle-income males who attained a bachelor's degree
MALEHIGH-percentage of high-income males who attained a bachelor's degree
MALEMARRIED-percentage of males from married households who attained a bachelor's degree
MALEUNMARRIED-percentage of males from unmarried households who attained a bachelor's degree
MALEHUMANITIES-percentage of males from humanities majors who attained a bachelor's degree
MALEPHYSCI-percentage of males from physical science majors who attained a bachelor's degree
MALEOTHERMAJOR-percentage of males from other majors who attained a bachelor's degree
FEMLOWWHITEASIAN-percentage of white/asian low-income females who attained a bachelor's degree
FEMLOWOTHER-percentage of other race low-income females who attained a bachelor's degree
FEMLOWMARRIED-percentage of low-income females from married homes attained a bachelor's degree
FEMLOWUNMARRIED-percentage of low-income females from unmarried homes attained a bachelor's degree
MALELOWWHITEASIAN-percentage of white/asian low-income males who attained a bachelor's degree
MALELOWOTHER-percentage of other race low-income males who attained a bachelor's degree
MALELOWMARRIED-percentage of low-income males from married homes attained bachelor's degrees
MALELOWUNMARRIED-percentage of low-income males from unmarried homes attained bachelor's degrees

Table 2: Logit Analyses for College Completion

	Full Major (1)	Full No Major (2)	Men Only (3)	Women Only (4)
Unmarried Odds	.4969	.4969	.5644	.4473
B_1	-.6994	-.6994	-.5721	-.8044
SE	.08295	.083	.1365	.0983
Other Race Odds	.6061	.6060	.6231	.5919
B_1	-0.5007	-.5009	-.4731	-.5244
SE	.083964985	.0841	.1227	.116
Low Odds	.4514	.4516	.4096	.4970
B_1	-.7954	-.7949	-.8927	-.6992
SE	.10690	.5729	.1651	.1475
Middle Odds	.5640	.5639	.5472	.5915
B_1	-.5727	-.5729	-.6030	-.5251
SE	.08350	.0833	.1185	.1268
PhysSci Odds	1.1836		1.2706	1.1469
B_1	.1685		.2395	.1371
SE	.3291		.5156	.5351
Other Odds	1.0220		1.0583	.9961
B_1	.0217		.0566	-.0039
SE	.1255		.1967	.184
Male Odds	.6841	.6849		
B_1	-0.3796	-.3784		
SE	.060416998	.0596		
Pseudo R^2	.0639	.0639	.0541	.0665
Wald F	46.331	63.6664	23.0403	27.8437
N	7900	7900	3400	4400

Table 3: Logit Analyses for College Completion

	Men Only (1)	Women Only (2)	Low Inc Male (3)	Low Inc Female (4)
Unmarried Odds B_1 SE	.5637 -.5732 .1356	.4477 -.8036 .0978	.4454 -.8088 .2356	.6844 -.3792 .1891
Other Race Odds B_1 SE	.6224 -.4742 .1230	.5921 -.5241 .1157	.5224 -.6493 .2256	.5658 -.5695 .2036
Low Odds B_1 SE	.4102 -.8911 .1646	.4967 -.6998 .1474		
Middle Odds B_1 SE	.5473 -.6028 .1182	.5910 -.5260 .1263		
Pseudo R^2	.0541	.0665	.0538	.0241
Wald F	23.0403	27.8437	10.9229	6.9042
N	3400	4400	600	900

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